5. DAFTAR PUSTAKA

Álvarez, I., Aleixandre, J. L., García, M. J., & Lizama, V. (2006). Impact of prefermentative maceration on the phenolic and volatile compounds in Monastrell red wines. *Analytica Chimica Acta*, *563*(1–2), 109–115. https://doi.org/10.1016/j.aca.2005.10.068

Azzolini, M., Fedrizzi, B., Tosi, E., Finato, F., Vagnoli, P., Scrinzi, C., & Zapparoli, G. (2012). Effects of Torulaspora delbrueckii and Saccharomyces cerevisiae mixed cultures on fermentation and aroma of Amarone wine. *European Food Research and Technology*, *235*(2), 303–313. https://doi.org/10.1007/s00217-012-1762-3

Baffi, M. A., Tobal, T., Henrique, J., Lago, G., Leite, R. S. R., Boscolo, M., Gomes, E., & Da-Silva, R. (2011). A Novel β-Glucosidase from Sporidiobolus pararoseus: Characterization and Application in Winemaking. *Journal of Food Science*, *76*(7), C997–C1002. https://doi.org/10.1111/j.1750-3841.2011.02293.x

Baffi, M. A., Tobal, T., Lago, J. H. G., Boscolo, M., Gomes, E., & Da-Silva, R. (2013). Wine Aroma Improvement Using a β-Glucosidase Preparation from Aureobasidium pullulans. *Applied Biochemistry and Biotechnology*, *169*(2), 493–501. https://doi.org/10.1007/s12010-012-9991-2

Barbagallo, R. N., Spagna, G., Palmeri, R., Restuccia, C., & Giudici, P. (2004). Selection, characterization and comparison of β-glucosidase from mould and yeasts employable for enological applications. *Enzyme and Microbial Technology*, *35*(1), 58–66. https://doi.org/10.1016/j.enzmictec.2004.03.005

Barbagallo, R. N., Spagna, G., Palmeri, R., & Torriani, S. (2004). Assessment of β-glucosidase activity in selected wild strains of Oenococcus oeni for malolactic fermentation. *Enzyme and Microbial Technology*, *34*(3–4), 292–296. https://doi.org/10.1016/j.enzmictec.2003.11.013

Baumes, R. (2009). Wine Aroma Precursors. In M. V. Moreno-Arribas & M. C. Polo (Eds.), *Wine Chemistry and Biochemistry* (pp. 251–274). Springer New York. https://doi.org/10.1007/978-0-387-74118-5

Benito, S., Hofmann, T., Laier, M., Lochbühler, B., Schüttler, A., Ebert, K., Fritsch, S., Röcker, J., & Rauhut, D. (2015). Effect on quality and composition of Riesling wines fermented by sequential inoculation with non-Saccharomyces and Saccharomyces cerevisiae. *European Food Research and Technology*, *241*(5), 707–717. https://doi.org/10.1007/s00217-015-2497-8

Bhatia, Y., Mishra, S., & Bisaria, V. S. (2002). Microbial β-Glucosidases: Cloning, Properties, and Applications. *Critical Reviews in Biotechnology*, *22*(4), 375–407. https://doi.org/10.1080/07388550290789568

Bindon, K. A., Dry, P. R., & Loveys, B. R. (2007). Influence of Plant Water Status on the Production of C 13 -Norisoprenoid Precursors in Vitis vinifera L. Cv. Cabernet Sauvignon Grape Berries. *Journal of Agricultural and Food Chemistry*, *55*(11), 4493–4500. https://doi.org/10.1021/jf063331p

Black, C. A., Parker, M., Siebert, T. E., Capone, D. L., & Francis, I. L. (2015). Terpenoids and their role in wine flavour: recent advances. *Australian Journal of Grape and Wine Research*, *21*, 582–600. https://doi.org/10.1111/ajgw.12186

Caldini, C., Bonomi, F., Pifferi, P. G., Lanzarini, G., & Galante, Y. M. (1994). Kinetic and Immobilization Studies on Fungal Glycosidases for Aroma Enhancement in Wine. *Enzyme and Microbial Technology*, *16*(4), 286–291. https://doi.org/10.1016/0141-0229(94)90168-6

Campo, E., Do, B. V., Ferreira, V., & Valentin, D. (2008). Aroma properties of young Spanish monovarietal white wines: a study using sorting task, list of terms and frequency of citation. *Australian Journal of Grape and Wine Research*, *14*(2), 104–115. https://doi.org/10.1111/j.1755-0238.2008.00010.x

Campo, Eva, Ferreira, V., Escudero, A., & Cacho, J. (2005). Prediction of the Wine Sensory Properties Related to Grape Variety from Dynamic-Headspace Gas Chromatography−Olfactometry Data. *Journal of Agricultural and Food Chemistry*, *53*(14), 5682–5690. https://doi.org/10.1021/jf047870a

Christmann, M., & Freund, M. (2010). Advances in grape processing equipment. In *Managing Wine Quality* (pp. 547–588). Elsevier. https://doi.org/10.1533/9781845699284.3.547

Ciani, M., Comitini, F., Mannazzu, I., & Domizio, P. (2010). Controlled mixed culture fermentation: a new perspective on the use of non- Saccharomyces yeasts in winemaking. *FEMS Yeast Research*, *10*(2), 123–133. https://doi.org/10.1111/j.1567-1364.2009.00579.x

Combina, M., Elía, A., Mercado, L., Catania, C., Ganga, A., & Martinez, C. (2005). Dynamics of indigenous yeast populations during spontaneous fermentation of wines from Mendoza, Argentina. *International Journal of Food Microbiology*, *99*(3), 237–243. https://doi.org/10.1016/j.ijfoodmicro.2004.08.017

Cordero Otero, R. R., Ubeda Iranzo, J. F., Briones-Perez, A. I., Potgieter, N., Villena, M. A., Pretorius, I. S., & Rensburg, P. van. (2003). Characterization of the β-Glucosidase Activity Produced by Enological Strains of Non-Saccharomyces Yeasts. *Journal of Food Science*, *68*(8), 2564–2569. https://doi.org/10.1111/j.1365-2621.2003.tb07062.x

Croteau, R., Kutchan, T. M., & Lewis, N. G. (2000). Natural Products (Secondary Metabolites). In R. Buchanan, W. Gruissem, & R. Jones (Eds.), *Biochemistry & Molecular Biology of Plants* (pp. 1250–1318). American Society of Plant Physiologists.

de Ovalle, S., Cavello, I., Brena, B. M., Cavalitto, S., & González-Pombo, P. (2018). Production and characterization of a β-glucosidase from Issatchenkia terricola and its use for hydrolysis of aromatic precursors in Cabernet Sauvignon wine. *LWT*, *87*, 515–522. https://doi.org/10.1016/j.lwt.2017.09.026

Escudero, A., Campo, E., Fariña, L., Cacho, J., & Ferreira, V. (2007). Analytical Characterization of the Aroma of Five Premium Red Wines. Insights into the Role of Odor Families and the Concept of Fruitiness of Wines. *Journal of Agricultural and Food Chemistry*, *55*(11), 4501–4510. https://doi.org/10.1021/jf0636418

Fernández-González, M., Di Stefano, R., & Briones, A. (2003). Hydrolysis and transformation of terpene glycosides from muscat must by different yeast species. *Food Microbiology*, *20*(1), 35–41. https://doi.org/10.1016/S0740-0020(02)00105-3

Ferreira, V., & Lopez, R. (2019). The Actual and Potential Aroma of Winemaking Grapes. *Biomolecules*, *9*(12), 818. https://doi.org/10.3390/biom9120818

Fia, G., Millarini, V., Granchi, L., Bucalossi, G., Guerrini, S., Zanoni, B., & Rosi, I. (2018). Beta-glucosidase and esterase activity from Oenococcus oeni: Screening and evaluation during malolactic fermentation in harsh conditions. *LWT - Food Science and Technology*, *89*, 262–268. https://doi.org/10.1016/j.lwt.2017.10.060

Garcia, A., Carcel, C., Dulau, L., Samson, A., Aguera, E., Agosin, E., & Gunata, Z. (2002). Influence of a Mixed Culture with Debaryomyces vanriji and Saccharomyces cerevisiae on the Volatiles of a Muscat Wine. *Journal of Food Science*, *67*(3), 1138–1143. https://doi.org/10.1111/j.1365-2621.2002.tb09466.x

Grangeteau, C., Gerhards, D., Rousseaux, S., von Wallbrunn, C., Alexandre, H., & Guilloux-Benatier, M. (2015). Diversity of yeast strains of the genus Hanseniaspora in the winery environment: What is their involvement in grape must fermentation? *Food Microbiology*, *50*, 70–77. https://doi.org/10.1016/j.fm.2015.03.009

Grimaldi, A., McLean, H., & Jiranek, V. (2000). Identification and partial characterization of glycosidic activities of commercial strains of the lactic acid bacterium, oenococcus oeni. *American Journal of Enology and Viticulture*, *51*(4), 362–369.

Gunata, Z., Bitteur, S., Brillouet, J.-M., Bayonove, C., & Cordonnier, R. (1988). Sequential enzymic hydrolysis of potentially aromatic glycosides from grape. *Carbohydrate Research*, *184*, 139–149. https://doi.org/10.1016/0008-6215(88)80012-0

Hornsey, I. (2007). *The Chemistry and Biology of Winemaking*. The Royal Society of Chemistry, UK. https://books.google.co.id/books?hl=id&lr=&id=MERTiT-6XBoC&oi=fnd&pg=PA1&ots=2VaHlQm2Pv&sig=oQ832ceZT4s6H-QcbSV2d4oT-oc&redir_esc=y#v=onepage&q&f=false

Hu, K., Jin, G.-J., Xu, Y.-H., & Tao, Y.-S. (2018). Wine aroma response to different participation of selected Hanseniaspora uvarum in mixed fermentation with Saccharomyces cerevisiae. *Food Research International*, *108*, 119–127. https://doi.org/10.1016/j.foodres.2018.03.037

Jackson, R. S. (2008). *Wine Science Principles and Applications* (Third). Elsevier Inc.

Janusz, A., Capone, D. L., Puglisi, C. J., Perkins, M. V., Elsey, G. M., & Sefton, M. A. (2003). (E)-1-(2,3,6-Trimethylphenyl)buta-1,3-diene: A Potent Grape-Derived Odorant in Wine. *Journal of Agricultural and Food Chemistry*, *51*(26), 7759–7763. https://doi.org/10.1021/jf0347113

Jenko, M., & Čuš, F. (2013). The Influence of Yeast Strains on the Composition and Sensory Quality of Gewürztraminer Wine. *Food Technology and Biotechnology*, *51*(4), 547–553.

Jolly, N. P., Varela, C., & Pretorius, I. S. (2014). Not your ordinary yeast: non-Saccharomyces yeasts in wine production uncovered. *FEMS Yeast Research*, *14*(2), 215–237. https://doi.org/10.1111/1567-1364.12111

Kang, W., Xu, Y., Qin, L., & Wang, Y. (2010). Effects of Different β-D-Glycosidases on Bound Aroma Compounds in Muscat Grape Determined by HS-SPME and GC-MS. *Journal of the Institute of Brewing*, *116*(1), 70–77. https://doi.org/10.1002/j.2050-0416.2010.tb00400.x

King, A., & Richard Dickinson, J. (2000). Biotransformation of monoterpene alcohols bySaccharomyces cerevisiae,Torulaspora delbrueckii andKluyveromyces lactis. *Yeast*, *16*(6), 499–506. https://doi.org/10.1002/(SICI)1097-0061(200004)16:6<499::AID-YEA548>3.0.CO;2-E

King, E. S., Kievit, R. L., Curtin, C., Swiegers, J. H., Pretorius, I. S., Bastian, S. E. P., & Leigh Francis, I. (2010). The effect of multiple yeasts co-inoculations on Sauvignon Blanc wine aroma composition, sensory properties and consumer preference. *Food Chemistry*, *122*(3), 618–626. https://doi.org/10.1016/j.foodchem.2010.03.021

Kurtzman, C. P., & Fell, J. W. (2011). *The Yeasts: A Taxonomic Study* (C. P. Kurtzman, J. W. Fell, & T. Boekhout (eds.); 5th ed.). Elsevier Science.

Lee, S.-J., & Lee, K.-G. (2008). Understanding consumer preferences for rice wines using sensory data. *Journal of the Science of Food and Agriculture*, *88*(4), 690–698. https://doi.org/10.1002/jsfa.3137

Li, N., Wang, Q.-Q., Xu, Y.-H., Li, A.-H., & Tao, Y.-S. (2020). Increased glycosidase activities improved the production of wine varietal odorants in mixed fermentation of P. fermentans and high antagonistic S. cerevisiae. *Food Chemistry*, *332*, 127426. https://doi.org/10.1016/j.foodchem.2020.127426

López, M. C., Mateo, J. J., & Maicas, S. (2015). Screening of β-Glucosidase and β-Xylosidase Activities in Four Non- Saccharomyces Yeast Isolates. *Journal of Food Science*, *80*(8), C1696–C1704. https://doi.org/10.1111/1750-3841.12954

Ma, D., Yan, X., Wang, Q., Zhang, Y., & Tao, Y. (2017). Performance of selected P. fermentans and its excellular enzyme in co-inoculation with S. cerevisiae for wine aroma enhancement. *Lwt*, *86*, 361–370. https://doi.org/10.1016/j.lwt.2017.08.018

Maicas, S., & Mateo, J. J. (2005). Hydrolysis of terpenyl glycosides in grape juice and other fruit juices: a review. *Applied Microbiology and Biotechnology*, *67*(3), 322–335. https://doi.org/10.1007/s00253-004-1806-0

Mateo, J. ., & Jiménez, M. (2000). Monoterpenes in grape juice and wines. *Journal of Chromatography A*, *881*(1–2), 557–567. https://doi.org/10.1016/S0021-9673(99)01342-4

Mendes-Pinto, M. M. (2009). Carotenoid breakdown products the—norisoprenoids—in wine aroma. *Archives of Biochemistry and Biophysics*, *483*(2), 236–245. https://doi.org/10.1016/j.abb.2009.01.008

Moreira, N., Mendes, F., Guedes de Pinho, P., Hogg, T., & Vasconcelos, I. (2008). Heavy sulphur compounds, higher alcohols and esters production profile of Hanseniaspora uvarum and Hanseniaspora guilliermondii grown as pure and mixed cultures in grape must. *International Journal of Food Microbiology*, *124*(3), 231–238. https://doi.org/10.1016/j.ijfoodmicro.2008.03.025

OIV. (2020). *State of the World Vitivinicultural Sector in 2019* (Issue April). https://www.oiv.int/public/medias/7298/oiv-state-of-the-vitivinicultural-sector-in-2019.pdf

OIV. (2021). *International Code of Oenological Practices*. International Orrganisation of Vine and Wine (OIV). https://www.oiv.int/public/medias/7713/en-oiv-code-2021.pdf

Padilla, B., Gil, J. V., & Manzanares, P. (2016). Past and Future of Non-Saccharomyces Yeasts: From Spoilage Microorganisms to Biotechnological Tools for Improving Wine Aroma Complexity. *Frontiers in Microbiology*, *7*(MAR), 1–20. https://doi.org/10.3389/fmicb.2016.00411

Palomo, E., Hidalgo, M., Gonzalezvinas, M., Perezcoello, M., Gonzales-Vinas, M., & Perez-Coello, M. (2005). Aroma enhancement in wines from different grape varieties using exogenous glycosidases. *Food Chemistry*, *92*(4), 627–635. https://doi.org/10.1016/j.foodchem.2004.08.025

Palomo, E. S., Díaz-Maroto, M. C., Viñas, M. A. G., Soriano-Pérez, A., & Pérez-Coello, M. S. (2007). Aroma profile of wines from Albillo and Muscat grape varieties at different stages of ripening. *Food Control*, *18*(5), 398–403. https://doi.org/10.1016/j.foodcont.2005.11.006

Palomo, E. S., Pérez-Coello, M. S., Díaz-Maroto, M. C., González Viñas, M. A., & Cabezudo, M. D. (2006). Contribution of free and glycosidically-bound volatile compounds to the aroma of muscat "a petit grains" wines and effect of skin contact. *Food Chemistry*, *95*(2), 279–289. https://doi.org/10.1016/j.foodchem.2005.01.012

Parley, A., Vanhanen, L., & Heatherbell, D. (2001). Effects of pre-fermentation enzyme maceration on extraction and colour stability in Pinot Noir wine. *Australian Journal of Grape and Wine Research*, *7*(3), 146–152. https://doi.org/10.1111/j.1755-0238.2001.tb00203.x

Pérez-Martín, F., Seseña, S., Izquierdo, P. M., Martín, R., & Palop, M. L. (2012). Screening for glycosidase activities of lactic acid bacteria as a biotechnological tool in oenology. *World Journal of Microbiology and Biotechnology*, *28*(4), 1423–1432. https://doi.org/10.1007/s11274-011-0942-9

Pineau, B., Barbe, J.-C., Van Leeuwen, C., & Dubourdieu, D. (2007). Which Impact for β-Damascenone on Red Wines Aroma? *Journal of Agricultural and Food Chemistry*, *55*(10), 4103–4108. https://doi.org/10.1021/jf070120r

Polášková, P., Herszage, J., & Ebeler, S. E. (2008). Wine flavor: chemistry in a glass. *Chemical Society Reviews*, *37*(11), 2478. https://doi.org/10.1039/b714455p

Pons, A., Lavigne, V., Eric, F., Darriet, P., & Dubourdieu, D. (2008). Identification of Volatile Compounds Responsible for Prune Aroma in Prematurely Aged Red Wines. *Journal of Agricultural and Food Chemistry*, *56*(13), 5285–5290. https://doi.org/10.1021/jf073513z

Ribereau-Gayon, P., Glories, Y., Maujean, A., & Dubourdieu, D. (2006). *Handbook of Enology Volume 2 The Chemistry of Wine Stabilization and Treatments 2nd Edition*. John Wiley & Sons Ltd, England.

Ristic, R., Bindon, K., Francis, L. I., Herderich, M. J., & Iland, P. G. (2010). Flavonoids and C13-norisoprenoids in Vitis vinifera L. cv. Shiraz: relationships between grape and wine composition, wine colour and wine sensory properties. *Australian Journal of Grape and Wine Research*, *16*(3), 369–388. https://doi.org/10.1111/j.1755-0238.2010.00099.x

Ristic, R., Danner, L., Johnson, T. E., Meiselman, H. L., Hoek, A. C., Jiranek, V., & Bastian, S. E. P. (2019). Wine-related aromas for different seasons and occasions: Hedonic and emotional responses of wine consumers from Australia, UK and USA. *Food Quality and Preference*, *71*, 250–260. https://doi.org/10.1016/j.foodqual.2018.07.011

Rodríguez, M. E., Lopes, C. A., Barbagelata, R. J., Barda, N. B., & Caballero, A. C. (2010). Influence of Candida pulcherrima Patagonian strain on alcoholic fermentation behaviour and wine aroma. *International Journal of Food Microbiology*, *138*(1–2), 19–25. https://doi.org/10.1016/j.ijfoodmicro.2009.12.025

Rosi, I., Vinella, M., & Domizio, P. (1994). Characterization of β-glucosidase activity in yeasts of oenological origin. *Journal of Applied Bacteriology*, *77*(5), 519–527. https://doi.org/10.1111/j.1365-2672.1994.tb04396.x

Saha, B. ., & Bothast, R. J. (1996). Production, purification, and characterization of a highly glucose-tolerant novel beta-glucosidase from Candida peltata. *Applied and Environmental Microbiology*, *18*(2), 155–158. https://aem.asm.org/content/62/9/3165.short

Salgado, J. C. S., Meleiro, L. P., Carli, S., & Ward, R. J. (2018). Glucose tolerant and glucose stimulated β-glucosidases – A review. *Bioresource Technology*, *267*(July), 704–713. https://doi.org/10.1016/j.biortech.2018.07.137

Sarry, J., & Gunata, Z. (2004). Plant and microbial glycoside hydrolases: Volatile release from glycosidic aroma precursors. *Food Chemistry*, *87*(4), 509–521. https://doi.org/10.1016/j.foodchem.2004.01.003

Schwab, W., Davidovich-Rikanati, R., & Lewinsohn, E. (2008). Biosynthesis of plant-derived flavor compounds. *The Plant Journal*, *54*(4), 712–732. https://doi.org/10.1111/j.1365-313X.2008.03446.x

Styger, G., Prior, B., & Bauer, F. F. (2011). Wine flavor and aroma. *Journal of Industrial Microbiology & Biotechnology*, *38*(9), 1145–1159. https://doi.org/10.1007/s10295-011-1018-4

Suriano, S., Alba, V., Tarricone, L., & Di Gennaro, D. (2015). Maceration with stems contact fermentation: Effect on proanthocyanidins compounds and color in Primitivo red wines. *Food Chemistry*, *177*, 382–389. https://doi.org/10.1016/j.foodchem.2015.01.063

Swangkeaw, J., Vichitphan, S., Butzke, C. E., & Vichitphan, K. (2011). Characterization of β-glucosidases from Hanseniaspora sp. and Pichia anomala with potentially aroma-enhancing capabilities in juice and wine. *World Journal of Microbiology and Biotechnology*, *27*(2), 423–430. https://doi.org/10.1007/s11274-010-0474-8

Torija, M. (2003). Effects of fermentation temperature on the strain population of Saccharomyces cerevisiae. *International Journal of Food Microbiology*, *80*(1), 47–53. https://doi.org/10.1016/S0168-1605(02)00144-7

Torija, M. J., Rozès, N., Poblet, M., Guillamón, J. M., & Mas, A. (2001). Yeast population dynamics in spontaneous fermentations: Comparison between two different wine-producing areas over a period of three years. *Antonie van Leeuwenhoek, International Journal of General and Molecular Microbiology*, *79*(3–4), 345–352. https://doi.org/10.1023/A:1012027718701

Toro, M. E., & Vazquez, F. (2002). Fermentation behaviour of controlled mixed and sequential cultures of Candida cantarellii and Saccharomyces cerevisiae wine yeasts. *World Journal of Microbiology and Biotechnology*, *18*(4), 347–354. https://doi.org/10.1023/A:1015242818473

Ugliano, M., & Moio, L. (2008). Free and hydrolytically released volatile compounds of Vitis vinifera L. cv. Fiano grapes as odour-active constituents of Fiano wine. *Analytica Chimica Acta*, *621*(1), 79–85. https://doi.org/10.1016/j.aca.2008.03.002

Vervoort, Y., Herrera-Malaver, B., Mertens, S., Guadalupe Medina, V., Duitama, J., Michiels, L., Derdelinckx, G., Voordeckers, K., & Verstrepen, K. J. (2016). Characterization of the recombinant Brettanomyces anomalus β -glucosidase and its potential for bioflavouring. *Journal of Applied Microbiology*, *121*(3), 721–733. https://doi.org/10.1111/jam.13200

Vilanova, M., Genisheva, Z., Bescansa, L., Masa, A., & Oliveira, J. M. (2012). Changes in free and bound fractions of aroma compounds of four Vitis vinifera cultivars at the last ripening stages. *Phytochemistry*, *74*, 196–205. https://doi.org/10.1016/j.phytochem.2011.10.004

Wang, X. C., Li, A. H., Dizy, M., Ullah, N., Sun, W. X., & Tao, Y. S. (2017). Evaluation of aroma enhancement for "Ecolly" dry white wines by mixed inoculation of selected Rhodotorula mucilaginosa and Saccharomyces cerevisiae. *Food Chemistry*, *228*, 550–559. https://doi.org/10.1016/j.foodchem.2017.01.113

Yuan, F., & Qian, M. C. (2016). Development of C13-norisoprenoids, carotenoids and other volatile compounds in Vitis vinifera L. Cv. Pinot noir grapes. *Food Chemistry*, *192*, 633–641. https://doi.org/10.1016/j.foodchem.2015.07.050